



Curitiba: The First City Will Creative Sustainability

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ABSTRACT

The drive for sustainability in Brazil began in the city of Curitiba, State of Parana, through 3 successive administrations of Mayor Jaime Lerner between 1971 and 1992. During this period, collaboration between the public and private authorities and the inclusion of all social classes and age groups was formed. There was a huge population growth in this city: in 1971 according to the IBGE (Brazilian Institute of Geography and Statistics) it was 356.830 inhabitants, reaching in 2022 about 1.773.733 inhabitants. The relationship between population density and sustainability advances will be analyzed. The thinking about the environment began with the research of an existing inventory of fauna and flora, aiming at the formation of more green areas for Curitiba and being under the responsibility of the Department of Research and Squares. Curitiba exceeded the who recommendation, regarding green areas, which foresees 12m² and reached 40m²/inhabitants. The Master Plan of Curitiba, as new needs arise, is systematically readjusted and corrected. Sustainability covered the various Departments of the City Hall, aiming at the preservation of green areas, fed by environmental actions, the reduction of polluting gas emissions, through the non-polluting bi-articulated electric bus, called “green transport”. The clear goals were achieved through the development of clean energy projects, food security (vegetable gardens and Urban Farm), recycled material in exchange for plant products, solar energy, composting program, culminating in the reurbanization of a suburban neighborhood, where all green renovation is being applied. These programs are evaluated and improved every six months, talking into account population growth and seeking new advances.

1. Introduction

The attention to the Environmental, precisely in the State of Paraná, came from 1721, when the Portuguese Ombudsman Raphael Pires Parotinho arrived at “Vila Nossa Senhora dos Pinhais” and named it Curitiba.

That village had been founded in 1693 by Matheus Martins Leme, as required by the Portuguese Ordinances and was inhabited by the Guarani Indians, who called it “kur yt yba” which means “quantities of pine trees” in the indigenous language.[1]

Scientifically, the pine is the *Araucaria angustifolia*, a tree that has the shape of a cup and its seed is the pine nut, a source of protein and food for consumption. (see Fig. 1 and 2)



Fig. 1 Araucaria Angustifolia



Fig. 2 Araucaria and its curved branches

This Portuguese authority instituted norms of care for Nature by its inhabitants. The cutting of trees could only take place in pre-established areas in the city. The Belem River should be systematically cleaned, the streets that have begun should be continued, in order to have a uniform growth of its layout. This is how the urban planning of Curitiba began; its growth was slow from the 18th century to the middle of the 20th century. (see the location – Fig. 3, 4 and 5)



Fig. 3 Map of Brazil and the location of Curitiba

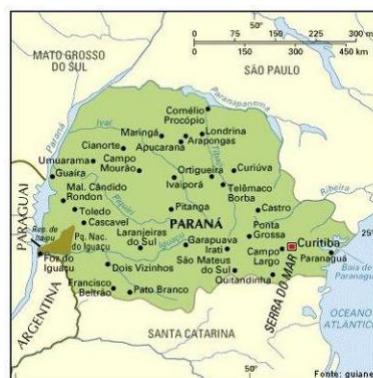


Fig.4 State of Paraná: capital: Curitiba



Fig 5 Curitiba Metropolitan Region

However, the urban restructuring took place when the architect Jaime Lerner became the mayor of the city, for 2 managements (1971-1975) and (1979-1983). He became Governor of the State of Paraná from 1989 to 1992, increasing his influence as an urban planner.[2]

Urban transformation was only possible to be continued for decades with the support of legislative approval. This ensured the continuation of the projects for Curitiba, regardless of the new Mayor who was elected.

Its importance was to provide parameters for the development of the city.

- a) Elaboration of an Avenue Plan starting from Tiradentes Square, whose problem was the congestion of vehicles in its surroundings, but maintained some important roads in the city such as Visconde de Guarapuava Street, Sete de Setembro Street and Marechal Floriano Street. This Plan was approved in 1945 by Decree N° 23 of February 5, 1942; (see Fig. 8)



Fig.8 Tiradentes Square – center of Curitiba

- b) He suggested the construction of two networks: one for water supply and the other for sewage collection;
- c) Sanitation could be solved by draining the swamps;
- d) Channeling of the Belem and Ivo Rivers, which cross the center of Curitiba, which caused floods;
- e) Creation of several centers: Civic, Commercial, Social, Supply (Municipal Market), Industrial Zone, Sports Center, Instruction Center (Polytechnic), Military Center, Recreation and Leisure Areas

This Plan guided the municipal authorities until 1958, when the Department of Urbanism of the City Hall was created, together with the Planning Commission of Curitiba – Coplac.

Later, a public competition was done for the elaboration of the Master Plan for Curitiba. The winning proposal was “Serete” and “Jorge Wilhelm Aquitetos Associados”, that established the Preliminar Plan in 1945. [5]

The reinforcement of urbanism came with the creation of the Curitiba Institute of Urban Planning Research – IPPUC. (It was recognized by Law N° 2828 on August 10, 1966). The body was vital for the urban organization of the city, meeting the needs that were emerging.[6]

In 1966 there was a revision of the Master Plan of Curitiba (Law N° 2828 of August 10. 1966) addressing the Urban Development Policy, the Urban Environmental Policy, the Social and Economic Policy and the Democratic Management of the city.

In 2014 there was an urban renewal with a new Master Plan Project, which was approved on 11/03/2015. It complied with all the determinations of the City Statute. (Law 10257/2001)

In 2015 there was another revision of the Master Plan (Law N° 14771 of December 17, 2015) so there was guidance and control of integrated development of the Municipality. This Master Plan aimed to provide conditions for the integrated, harmonious and sustainable development of Curitiba, together with the Metropolitan Region. It has become a basic, global and strategic instrument of the Urban Development Policy, decisive for all public and private agents. It is compatible with national, regional and state plans for land use and economic and social development.

The following are part of Curitiba Master Plan:

- a) Specific legislation for urban planning;

- b) Sectoral Plans for: Mobility and Integrated Transport, Housing and Land Regularization, Economic Development, Social Development and Civil Defense, Environmental Development and Biodiversity Conservation and Basic Sanitation;
- c) Strategic Plans: Cycling Plan, Climate Mitigation and Adaptation, Urban Landscape, Underground Zoning, Pedetrialization and Sidewalks, Accessibility. Innovation and Design, Urban Afforestation Strategy , Culture, Tourism, Sports and Leisure, and Integrated Management and Recovery of Water Resources;
- d) Regional Administrative Plans;
- e) Neighborhood Development Plans;
- f) Neighborhood Plans;
- g) Action and Investment Plans;
- h) Other Plans, Programs and points;

The current Curitiba Plan (2024) will review the previous 2015 Plan. (Decree N° 872 2024 dated June 12, 2024). After 90 days, the stages of realization and updating of the Plan will be defined. The Master Plan Review suggests new axes of densification and autonomous neighborhoods, based on the capital's trinary transport model. (see Table 1 – synthesis)

The updates are being adjusted, according to the needs of climate change, sustainability, technological innovations, development and growth of the city, increasing the improvement of the quality of life and health of users.

(see a synthesis – Table 1)

Table 1

Urbanization Curitiba – 20th century

Epoch	Approval	Proposals
1941 – 1943	1945	Agache Plan <ul style="list-style-type: none"> . Planning of Avenues from Tiradentes Square; . Solution for sanitation and drainage of the marshes; . Canalization of Belem and Ivo Rivers to avoid floods; . Creation of several specific centers (civic, commercial, social, supply, industrial, sports, education, military, recreation and leisure) . Preliminary Plan – “Serete and Jorge Wilhelm Arquitetos Associados”
1965	_____	<ul style="list-style-type: none"> . Creation of Institute of Urban Planning of Research and Culture – IPPUC
1966	1966	<ul style="list-style-type: none"> . Revision of Curitiba Planning, approached: Policy of Urban Development, Urban Environmental, Social and

1966	Law N° 2828 10/08/1966	Economic Policy and the Democratic Management of the city; . Urban Renewal with a new Master Plan Project. It complied with all determinations of the City Statute (Law 10257/2001)
2014	_____	. Revision of the Director Planning approached: guidance and control of Integrated Development and Sustainable of the city: specific Legislation, Strategic and Sectorial Planning, Regional Administrative Investment Plan, and others relevant;
2015	Law N° 14771 17/12/2015	. Revision of the plan of 2015 Dec. n° 872/2024 -12.06.2024 Suggests: new axes of densification and autonomous neighborhood from the model of Public transportation (trinitarian) Updates: Adjustments to the climatic changes, of sustainability, technologic innovations, development and growth of the city, better quality of life.
2024	There is none yet	.

3. Results

They are the result of Public Policies carried out by the Municipality of Curitiba, integrated with several Government Secretariats and approved by the Legislative Power. Below, we will outline some of the most effective project outcomes.

a) Project: “Curitiba more energy”

It aims to popularize clean energy in the city. It was created and termed as the “Solar Pyramid”. It is 1st landfill solar plant in Latin America. It was inauguration in March in 2023 with about 8.600 solar panels. Curitiba transformed the landfill in the “Caximba” neighborhood, deactivated in 2010, into a clean energy generator. It became the new symbol of the city, known as an ecological capital.



Fig.9 Curitiba transforms landfill into solar power plant

The energy generated through photovoltaic modules of the Solar Pyramid is injected into the distribution network of the Energy Company of Paraná (COPEL) and the amount is deducted from the Municipality's energy bill. According to this Company, the savings are estimated at about 30% on the value of the Municipality's public buildings. It represents 2 million and 650 thousand reais corresponding to 13 million and 356 thousand dollars and reverted to the benefit of the population, either in electricity or being able to subsidize 1000 meals/day for 1 year and a half for the "Solidary Table" Program.

This project has the international support of the "Cities Finance Facility" (CFF) of the C40 group of major cities for Climate Leadership of the "Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, which supports cities in the development of projects to reduce gas emissions and curb the growth of global temperature.

This Program is funded through institutions in several countries such as: the German Federal Ministry for Economic Development and Cooperation (BMZ), the United Kingdom Department for Business, Energy and Industrial Strategy (BEIS) and the United States Agency for International Development. (USAID) [6]

This project shows that it was possible to transform a disabled landfill area about 14 years ago into a solar plant. The aim was reached with a clear energy and low cost for the population more deprived of the city.

b) Project: "Correct Waste Disposal"

The Municipality of Curitiba created the "Ecopoints". There are 13 sites in the city, which serve for the population to dispose of construction waste such as wood, remains of tree pruning, garden cleaning, broken furniture, cooking oil and grease already used.

Some "Ecopoints" are part of the composting Program, which receive household organic waste. The result is a fertilizer for the population to use in their gardens.

Another accomplishment of this project by the Department of the Environment is the work together with the inhabitants in a joint effort, collecting electronic waste to prevent that this type of waste contaminate the soil and, consequently, the Nature. (see Fig.10 and 11)



Fig. 10 Recycling bin for recyclable Materials



Fig. 11 Mixed recycling bins: building materials

c) Program: “Composting”

This Program is called “COM-POS-TE CURITIBA”. It is in line with legislative approvals, which encourage the significant reduction of organic waste and is sent to landfills.

The City Council of Curitiba distributed about 1000 kits of home composters with worms for the population to be encouraged to compost in their own homes.

Participants in this program must register themselves in the “Curitiba Guide” to receive the kit, with guidelines through the City Council website. In addition there are courses that come with a Manual to explain the composting process.



Fig. 12 Sustainability is composting – explanatory magazine

d) Project: Preservation of Green Areas

It is related to the population growth of Curitiba. The population of this city in 1970 was 625.362 inhabitants and grew in each decade approximately 200.000 inhabitants. It arrived in 2022 with 1.773.718 inhabitants, according to data from the Brazilian Institute of Geography and Statistics - IBGE (see Table 2)

Table 2
Population Census

Population Census		
Census (year)	Population	Percentage (%)
1960	356.830	97,6
1970	652.362	80,0
1980	1.025.079	59,6
1991	1.290.142	25,9
2000	1.586.848	23,0
2010	1.746.896	10,1
2022	1.773.733	1,5

Fonte: Brazilian Institute of Geography and Statistics IBGE

The creation of more green areas in Curitiba contributed to water control, preventing floodings. The Barigui Park, for example, used areas of old mining to capture water during the hydro crisis.

Today Curitiba has 30 parks which are highlighted: “Barigui, São Lourenço, Passaúna, Bacacheri, Tanguá, Tingui, Lago Azul, and 15 woods, such as, do Alemão, do Papa, Reinhard Maack, as well Botanical Garden, Public Promenade and Zoo. (see some Figures: 13, 14 and 15)



Fig. 13 Passaúna Park



Fig. 14 Wire Opera



Fig. 15 Environmental Free University

Bellow there is the Table 3 which shows data on green areas (years and area). The vegetation cover is 11.875.759,05m². The result is 60m²/inhab. while OMS' recommendation is 12m²/inhab. Curitiba fulfilled its role and surpassed 5 times more.

Table 3
Green Areas

Green Areas		
Year of Foundation		Area (m2)
1886	Public Promenade	69.285
1972	São Lourenço Park	204.000
1972	Barigui Park	1.400.000
1980	Wood of Papa	46.337
1982	Zoo	589.000
1989	Bosque Reinhrd Maack	78.000
1991	Botanic Garden	245.000
1992	Zaninelli Wood	37.000
1994	Public Promenade	60.285
1994	Tingui Park	427.492
1996	Alemão Wood	38.000
1996	Tanguá Park	235.000
1998	Bacacheri	152.000

Fonte: Municipal Mayor of Curitiba

In the 20th century, Curitiba still had big marshes, which expand for the neighborhood at the rainy season, being one of the great problems of the city; From the marshes, the squares were created.

These served for the population's leisure, for the improvement of health and quality of life.

e) Project: "Friends of the rivers and 100.000 trees"

This project is aimed at environmental improvements and had the participation of the community. It is integrated with several actions: regulation of sewage connections, inspection, cleaning of rivers, works and Environmental Education.

In 2019, the City Council launched the planting of another 100.000 trees. In 2020, it reached the expected number, with 108.000 seedlings planted, even during the pandemic period.

The result came from the management of the Department of Parks and Squares – MAPP, which encouraged the variety of plant species and fauna, with 350 species of wild animals in Curitiba. This

inventory was carried out by the Natural History Museum “Capitão da Imbuia” of the Department of Research and Conservation of Fauna – Municipal Secretariat of the Environment.

The list of animals made up of birds, mammals, reptiles, insects, among others, is available for consultation by the population through the website of the Animal Protection Network.

The preservation of the green and the gradual increase is the result of municipal legislation and the application of public policies in the last 5 decades, promoting environmental education. It extends in schools, reaching all age groups in the Parks, with several plaques alluding to raise awareness among the new generations of the need to preserve Nature. The advertisement is suggestive, colorful, and with created characters.

The aim of more and more green in the city was reached, but it continues on a constant work and in rise. The governings suggested it and the population accepted and defend it.

f) Project: “Honey Gardens”

The practice of cultivating native stingless bees came from the pollinisation of plants in Brazil. Curitiba currently has 56 places in parks with boxes that house them and can be visited by the public. Training courses are available to those interested periodically, which are given by the stingless “Guardians of the Bees, contributing to the maintenance of the culture, which originates from the indigenous peoples. The products generated by the honey are sold in the Parks themselves and reverted to these guardians. (see Fig. 16 and 17)



Fig. 16 Bee box



Fig. 17 Bee in the hive

g) Program: Animal Protection Network

The Municipal Free Neutering Program was created in 2017, which aims to implement a Public Policy to prevent the abandonment of animals such as dogs and cats, keeping them healthy and providing them with assistance. There are also the so-called “Independent Protectors of Animals”. These are people who are registered to protect them in their homes, but have continuous supervision from the City Council for the treatment of the animals.

The Curitiba Zoo is located inside the Iguazu Park and has 589.000m² housing 1800 animals. It was inaugurated in 1982. Currently it has a specialized team for activities with school students, elaborates environmental workshops both internal and external, going to school with the “Animal Theater”. [7] (see Fig. 18)



Fig.18 Zoo Curitiba

h) Project: “Food Security – Community Gardens/Solidarity Table”

This project was designed and structured due to the large number of people living with social vulnerability and food insecurity in the city.

The following were implemented: an “Urban Farm” as an educational space for the practice of agriculture, 147 “community gardens” and the Solidarity. [8] (see Fig.19 and 20)



Fig. 19 Community gardens



Fig. 20 Child looking at vegetables

Community gardens are primarily sustainable, because there is no use of pesticides. They are divided into traditional ones with the use of fertilized land and Japanese gardens with the use of water mixed with mineral salts.

The land used is that which has been abandoned by the government. The work is carried out by volunteers who are organized by families who live in the vicinity of the gardens. These become food production hubs and generate job and income opportunities for family groups.

The initiative the project of community vegetable gardens creation was the contribution to the population of greater economic vulnerability together with the neighborhood. There is the cultivation of vegetables and the production is shared among

i) Project: “Environmental Education”

A children’s symbol called “Leaves Family” was created to reinforce environmental education, showing the concepts of sustainability. It is linked to the Program: “Garbage Collection that is not Garbage” by the City Council. The importance of the correct disposal of domestic waste, the reuse of water and the use of renewable energy are explained. [9]



Fig. 21 Leaves Family



Fig. 22 The green clan in the street

This campaign is made up of children's characters from the green clan: "Seu Folha, Dons Fofô, Folis" and others. These characters – dolls – were placed on bicycles that pedal around the city and others in the Parks themselves, raising awareness the population. (see Fig. 21 and 22)

j) Program: "Ecocitizen"

This is recycled material. It is searched the Scavengers who walk around the city. Currently there are 40 Associations of Waste Pickers. They sell collective collection waste in Curitiba, This program is coordinated by the Department of the Environment, aiming to improve the lives of waste pickers and strengthen the network for the collection and separation of recyclable materials.

l) Program: "Green Exchange"

This involves the exchange of recycled materials such as paper, cardboard, glass, metals, domestic oil already used for fruits and vegetables.

The results each month is 290 tons of recyclables and 3.500 liters of oil, which are no longer disposed of incorrectly and become food on people's tables.[10]

Curitiba supports and is in accordance with the 2030 Agenda and the Sustainable Development goals.



Fig. 23 Recycled materials



Fig.24 Exchange for fruits and vegetables

This Program has been given the opportunity to the population of Curitiba to have a healthier feeding and consequently health. (see Fig. 23 and 24)

m) Program: Walk Better

It is part of the "Curitiba Cycling Plan" It stimulates active mobility, especially of young people, and by this means there in an improvement in quality of health of the inhabitants.

At the end of 2024, more than 400km of cycling infrastructure is planned in most of city's neighborhoods.

n) Project: Cultural Rescue

The historic center of the city was reactivated, emphasizing the oldest church in city (Church of the Rosary, founded in 1737) creation of a cultural center where they hold exhibitions and other events

such as various courses, presentation of handicrafts, rescuing the cultural memory of Curitiba among the initial houses of the city. The Pope's Woods, founded by Pope John Paul II in 1980, shows the typical wooden houses of Polish immigrants and their utensils. [11] And others such as the Ukrainian Memorial in Tingui Park, with customs of Ukrainian immigrants and the Japanese Pavillon (Japanese immigrants). (see Fig. 25. 26 and 27)

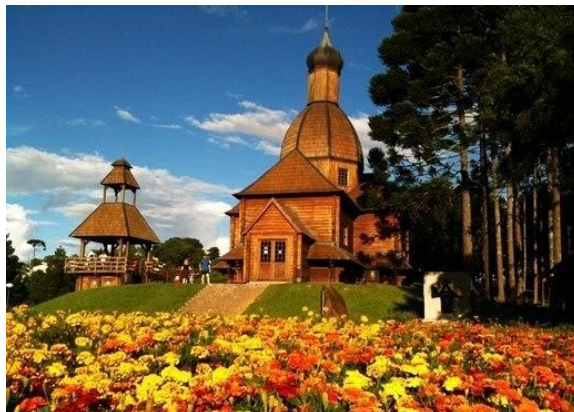


Fig. 25 Ukrainian Memorial – Tingui Park



Fig. 26 Pope John Paul II Wood



Fig. 27 Japanese Pavillon

The history of the immigrants who built Curitiba, German, Ukrainian Polish, Portuguese and Japanese was ransomed through memorials in squares, woods and parks.

o) Project of the New Neighborhood on “Caximba”

The new neighborhood of Caximba will be the first smart neighborhood Brazil in the city of Curitiba. This action will solve a major environmental and social problem in a needy area. It will constitute “a great laboratory of urban innovations as described by the Institute of Research and Urban Planning – IPPUC. It will show the union of multisectorial solutions grouped in a project called: “Bairro Novo de Caximba Climate Risk Management Project”

Its realization has been possible due to the financing of French Agency of Development in the most part (38,1 million of Euro) and Municipal’ counterpart (9,5 million of Euro).

The connection of the project will environmental issues guaranteed the appeal of the French Development Agency, financier of the action, which was approved by the City Council. [12]

The project was inspired by solutions in Spain (Barcelona) and Canada (Toronto SideWalk. Both were actions integrated into the concept of “smart cities”.

The pillars of this Caximba project are: sustentability first, followed by entrepreneuriat education, social rescue management and environmental impacts and problems. [13]

There is the possibility of job creation, the resident population working and living with the restructuring of the neighborhood, avoiding commuting, through public transport, Popular participation is intrinsically related to the project. This model will be repeated for other neighborhoods in the city. The built area of the houses is of 44.000m², (50.00m² each) and stays along a Green Corridor, that forms a Linear Park with leisure and sportive activities for the Community.

The beginning of the project was the construction of 752 houses in October 2022. Other initiatives have being studied and created in a short, medium and long term with a view to the 2030 Agency. For example, the transformation of solid waste into energy. In 2030, a technical cooperation agreement was signed between the City of Curitiba and the Brazilian Association of Portland Cement (ABCP), which will allow the use of the fuel for the manufacture of cement by local cement companies. Several companies participate in this project, such as Votorantim (Rio Branco do Sul), Itambé (Barba Nova) and others.

(see Fig. 28, 29 and 30)



Fig. 28 Original neighborhood



Fig. 29 Project of the New Neighborhood on Caximba



Fig. 30 Construction of the houses

4. Conclusions

The conclusion that we arrived is that Curitiba city is on a promising way as for Urban Policies.

The City's Mayor coordinates the actions through several Municipal Departments. These are always approved by Legislative Power, but there is an important detail that is a management with the participation of the population. Their wishes and necessities are discussed and introduced in the government projects. In synthesis governmental power + people walk in a only a direction. [14]

Referring to health projects that involve an improvement at the feeding, as the community vegetable gardens, elucidation of nutritional value to the mother and children are positive and grow in a greater number of neighbors of the city.

These projects were proved and the results are in ascension.

The introduction of the construction of an intelligent city applied in the neighbor of Caximba has not concluded yet, after 7 years, The creative project, ransoming the shut areas is valid, but it is necessary to be valued every 6 monts; he must always be readjusted and adapted to the local needs.

Curitiba, city aided by immigrants, strenghtens its origins with Memorials and Parks, resoming their respective Material Heritage (employment of houses with Polish, Japanese, Ukrainian constructive techniques, and immaterial (Italian and German).[15]

There was a valorization of the historic center, that nowadays is mixed together with a cultural center dedicated to music, explanations, handcraft and leisure.

In the future, the union of governmental actions must always continue, because Curitiba, that has this procedure is the only Brazilian efficient ecological city and with continuity.

The system of radial transportation favor the users who always need to pass by downtown, congesting it, but the time of delay of the bus, it is still deficient. The number of bus needed to grow, due to the increase of the population.

The creation of the solar energy factory completes the innovations of this project, contributing to let the cost down of energy for the population and still obtain the clear energy. In the next future other factories will be built in the city.[16]

All the actions are welcome that improved and improve not only Curitiba, but also all the cities of the world. If there is policy will the popular will accept and there will have the acquaintanceship in harmony.

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References

- [1] Almeida, N. L. (1978). *"História de Curitiba: ensaio sobre sua evolução"*. Imprensa Universitária, Curitiba.
- [2] Arashiro, P. (1978). *"Planos Diretores de Curitiba e aplicações da biocidade: propostas para o urbanismo sustentável"*, Universidade Federal do Paraná, Curitiba..
- [3] IPPUC, (1995). *"Memória de Curitiba urbana"*Instituto de Planejamento e Pesquisa Urbana de Curitiba, Curitiba.
- [4] IBGE, (1980). *"Anuário Estatístico"*Instituto Brasileiro de Geografia e Estatística, Curitiba.
- [5] Wilhelm, J. *"Seminário sobre o Plano Diretor de Curitiba: uma abordagem Metropolitana"*. Câmara Municipal de Curitiba, Curitiba.
- [6] *"Plano de Desenvolvimento Urbano Comunitário para o Bairro da Caximba"*(2020).Universidade Federal do Paraná, Curitiba.
- [7] *"Zoológico e Passeio Público"* (2020). Secretaria Municipal do Meio Ambiente, Curitiba.
- [8] Reijntjes, C. and Haverkort, B. and Water-Bayers A. *"Farming for the future: an introduction to low-external-input and sustainable agriculture"*.The Macmillan Press. London.
- [9] Silva, M. M. P. (2023) *"Manual de Educação Ambiental: uma contribuição e formação de agentes multiplicadores"* Contexto, Curitiba.
- [10] PMC. (1996). *"Programa Câmbio Verde"*. Prefeitura Municipal de Curitiba, Curitiba.
- [11] Pollak, Michael. *"Memória e Identidade Social"*. Estudos Históricos, Rio de Janeiro.
- [12] PMC. (2020). *"Bairro novo do Caximba"*. Prefeitura Municipal de Curitiba, Curitiba.
- [13] Miranda, H. F. (2010) *"Mobilidade urbana sustentável e o caso de Curitiba"*, Universidade de São Paulo, São Carlos.
- [14] Silva, Marcelle B. L.(2018) *"Os grandes projetos e as políticas de Desenvolvimento Urbano: estudo sobre a operação urbana e linha verde em Curitiba"*. Universidade Federal do Paraná, Curitiba
- [15] Coelho, L. X. P. (2015) *"O mito do Planejamento urbano democrático"*. Terra de Direitos, Curitiba.
- [16] Cestaro, L. R.(2021) *"Ensaio para a participação popular: o Plano diretor de Curitiba: a revisão do Plano Diretor em 2014"*, Bitâcora 31, Curitiba.
- [17] . sites: www.ippuc.org.br
www.geocuritiba.ippuc.org.br
www.curitiba.pr.gov.br/instituto-de-pesquisa-e-planejamento-urbano-de-curitiba-ippuc/1334
www.curitiba.pr.gov.br